

**ANOMALOUS WOOD MINERALISATION FROM TUFFS AND PHREATOMAGMATICS OF ČESKÉ STŘEDOHOŘÍ AND DOUPOV MTS.**

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**Introduction:** Natural permineralisation of wood is a unique fossilisation process resembling a detective story [1]. If we look at stone-like wood cut and polished, with its original wood structure more or less preserved in a three-dimensional form, we might call it ‘natural art’, a book ready to read, or a snapshot from a random moment in the Earth’s history. It testifies to a particular palaeoenvironment during which it was formed, and later possibly diagenetically overprinted.

Volcanic environments favour silicification and other kinds of permineralisation [1-3], because volcanism is accompanied by (i) flows of thermal and mineralised fluids and (ii) seismic activity, fires, lahars or landslides that may withhold organic matter from its natural biogeochemical recycling. Volcanism runs like a catastrophic event that enables a fast burial. Volcanic fall-out can preserve whole ecosystems *in situ* as they existed; such fossil sites are called T<sup>0</sup> assemblages and are famous for their integrity [2-3]. Additionally, permineralisation influenced by volcanism can even occur in fluvial sediments, where the material is modified by transport. In the last decades, modern approaches in fossil wood research have been used [1].

Oligocene volcanoclastics of the České Středohoří and the Doupov Mts. (Fig. 1) host wood permineralised in such unusual ways that they are promising discoveries, similar to the very rare vanadate mineral wakefieldite found in silicified wood from Eastern Bohemia [4]. During the last 15 years, Z. Dvořák and J. Svejkský (North Bohemian Mines, j.s.c.) gathered wood specimens that have anomalous mineral compositions and have never been studied by petrographical and geochemical means. According to preliminary X-ray diffraction analyses, yet the only available analyses (bulk and destructive), the fossils are bizarre: they consist of zeolites (phillipsite), feldspars, carbonates, various phases of SiO<sub>2</sub>, often variable within a single locality. Several samples were studied by xylotomy and the well-preserved pieces were attributed to particular taxa [5]. Such exotic permineralisations are a challenge for research. There are many questions still unanswered. What could have been the course of a particular fossilisation? What forced minerals to be formed in the former plant tissue? Was the permineralization started by filling empty spaces (e.g. lumina), coating cell walls, or replacing them? Are there any

signs of microbial or herbivorous activities in cells that played a role in wood preservation? Are there any signs of burning, or resin presence? What influence the volcanism had? To answer those questions we will apply various imaging and analytical tools in the sense of methods published in [1].

This research will be conducted in an interdisciplinary way, spanning from the biogeochemical-mineralogical frontier, having ambitions to move forward our understanding of wood permineralisation in volcanics and to contribute to broadening our knowledge on wood preservation.

**References:** [1] Matysová P. (2016) *PhD Thesis*. [2] DiMichele W.A. & Falcon-Lang H.J. (2011) *J Geol Soc* **168**, 585-605. [3] Rößler R. et al. (2012) *Palaaios* **27**, 814-834. [4] Matysová P. et al. (2016) *Eur J Mineral* **28**, 869-887. [5] Koutecký V. & Sakala J. (2015) *Acta Mus Nat Pragae, Ser. B Hist Nat* **71**, 377-398.

**Figure 1:** The sample set covers ca 10 tuff/lahar/volcanic breccia localities listed below and marked on the map right:

- *České Středohoří Mts.:* Bečov near Most, Břvany, Velká Bukovina, Církvice – Deblík Hill, Ludvíkovice – Sokol’s Hill, Měrunice – Stříbrník Hill
- *Doupov Mts.:* Stráž nad Ohří, Vrbice near Valeč, Podbořany

